# Appendix A.2

# Metcalf & Eddy Supplemental Data Compendium

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# SUPPLEMENTAL DATA COMPENDIUM FOR WELLS G&H SUPERFUND SITE ABERJONA RIVER STUDY (OPERABLE UNIT 3)

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SUPPLEMENTAL DATA COMPENDIUM
WELLS G&H SUPERFUND SITE
ABERJONA RIVER STUDY
(OPERABLE UNIT 3)

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## 1.0 INTRODUCTION

This document contains a summary of field information and data that was collected by M&E at the Aberjona River (Operable Unit 3) of the Wells G&H Superfund Site during the fall of 1997. The data was collected to support the human health and ecological risk assessments being conducted for EPA Region I under the Remedial Action Contracting Strategy (RACS) contract as part of Work Assignment No. 004-RICO-0146.

The field investigation conducted by M&E in 1997 supplements Foster Wheeler Environmental Corporation's (FW's) field investigation, which was conducted in 1995. The data collected during FW's 1995 field investigation are presented in their Preliminary Data Compendium (FW, 1996a). This compendium presents only M&E's 1997 data, as well as a brief discussion of data trends and comparisons with FW's 1995 data. Specifically, additional sediment data was collected to verify FW's 1995 results, to fill data gaps where 1995 sediment data were rejected, and to achieve lower detection limits to meet risk-based concentrations (RBCs) and ecological screening values for sediments referred to as effects range-low (ERLs).

The compendium is organized into the following sections:

Section 2.0 -- describes M&E's field sampling program
Section 3.0 -- presents the sediment sample results and discusses validation of the data
Section 4.0 -- discusses the sediment data in terms of major types of chemical classes detected and provides a comparison of M&E's and FW's data, where relevant
Section 5.0 -- provides references cited in the text

## 2.0 SAMPLING AND ANALYSIS PROGRAM

Sampling of the Aberjona River and the surrounding wetlands was conducted according to M&E's Revised Draft Work Plan for the Remedial Investigation/Feasibility Study (Risk Assessment) for the Aberjona River (OU3) Wells G&H Superfund Site (1997a). The field sampling program and the analytical program is described in M&E's Final Quality Assurance Project Plan (QAPP) for the site (1997b). No significant deviations from these plans occurred during the sampling effort.

### 2.1 Field Sampling Program

The field sampling program followed by M&E is described in the Final QAPP (M&E, 1997b). Prior to conducting the main event sampling, a pre-test sampling was performed in conjunction with EPA. The purpose of the pre-test was to fine tune the field sampling protocols and test the analytical methods (Section 2.2) for applicability before collecting the actual sediment samples that would be used for the risk assessments. The pre-test was conducted over a two-day period from October 15 to 16, 1997. Both M&E and EPA personnel participated in the collection of samples from locations SED-13-01 and SED-19-01 during the pre-test. All other sample locations were located during the pre-test. No data validation was conducted on the pre-test sample results. The results were

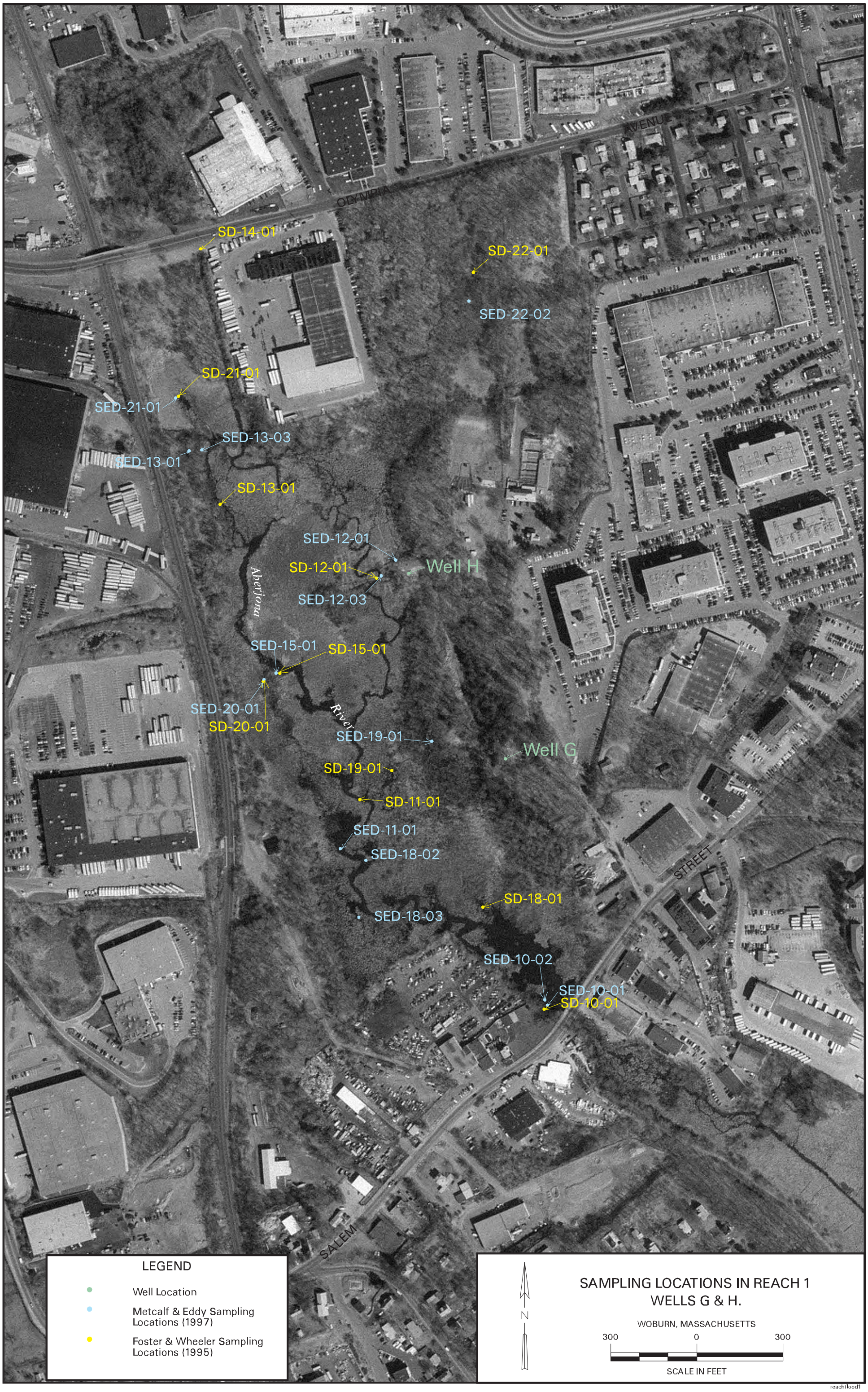
examined to establish if the methods would meet the goals of the risk assessments, which they did. No changes in methodology were proposed from the pre-test sampling and analysis.

Sediment samples from 28 sampling locations (Figures 2-1 through 2-5, Table 2-1) within the Aberjona River, surrounding wetlands, and several background locations were collected and analyzed for volatile organic compounds (VOCs), polynuclear aromatic compounds (PAHs), pesticides and polychlorinated biphenyls (PCBs), low concentration metals, acid volatile sulfides/simultaneously extracted metals (AVS/SEM), and total combustible organics (TCO), grain size, moisture content, and pH. As per the QAPP, TCO analyses were conducted rather than Total Organic Carbon (TOC) due to the measurement of TCO being greater than one percent. The sampling was conducted between November 12, 1997 and November 20, 1997.

As previously stated, sample locations were selected primarily to confirm results previously obtained in 1995 by FW, to fill data gaps where FW's 1995 data were rejected, and to achieve lower detection limits to meet risk-based objectives. When field observations warranted, however, sampling locations were relocated, near the original location, but where the depositional sediments were most likely to be found (Table 2-2). All relocated sampling locations were approved by onsite EPA personnel. All sampling locations were mapped by EPA using a Global Positioning System (GPS) unit to establish the precise location of each sample. GPS information was used to generate Figures 2-1 through 2-5. In addition to the analytical samples collected, 12 locations were sampled for sediment toxicity testing. One additional location, Fowle Brook, was sampled only for toxicity testing. The samples were provided to EPA and the testing was performed by the EPA laboratory in Lexington, Massachusetts. The results of the toxicity testing and the GPS coordinates are presented in Appendix A.

Sediment samples were collected using several methods. Volatile samples were collected using a modified plastic syringe to collect a solid core of undisturbed sediment directly from the river bottom or from the sediment sampler and were placed directly into the sample jar. Sediment for all other parameters was collected using conical bulb planters or an Eckman dredge.

For the non-volatile parameters, once sufficient sediment was placed into a decontaminated 5-gallon pail, standing water was decanted, often several times. The sediment was then visually checked to assess the amount of retained moisture. This was particularly important since organic matter was a large fraction of most sediment samples, and organic matter strongly retains moisture. For this reason, most of the sediment samples were then placed into a large colander lined with several sheets of Whatman® No. 4 filter paper. Several sheets of filter paper were placed on top of the sediment and the sediment was blotted/squeezed dry. The layers of filter paper were changed frequently until most of the non-interstitial moisture was removed from the sediment. If the moisture content of the sediments was considered to be excessive, aliquots of the sediment were placed onto a decontaminated sieve stack of #4, #20, #50, and #200 sieves and the water was allowed to drain. After draining, the sediment was squeezing through the sieve stack to remove most of the water. Any twigs or other material residing on the #4 sieve was discarded. The sieved sediment was then placed on filter paper to dry the sample further. The samples were left on the filter paper no longer


OLYMPIA AVENUE
SD-14-01
SD-22-01
SED-22-02
SD-21-01
SED-21-01
SED-13-03
SED-13-01
SD-13-01
SED-12-01
Well H
SD-12-01
SED-12-03
Aberjona River
SED-15-01
SD-15-01
SED-20-01
SD-20-01
SED-19-01
Well G
SD-19-01
SD-11-01
SED-11-01
SED-18-02
STREET
SD-18-01
SED-18-03
SED-10-02
SED-10-01
SD-10-01
SALEM
LEGEND
Well Location
Metcalf & Eddy Sampling Locations (1997)
Foster & Wheeler Sampling Locations (1995)
N
SAMPLING LOCATIONS IN REACH 1
WELLS G & H.
WOBURN, MASSACHUSETTS
300
0
300
SCALE IN FEET
reachflood1


Aberjona
River
SD-16-01
SD-09-01
SD-08-01
LEGEND
Well Location
Metcalf & Eddy Sampling Locations (1997)
Foster & Wheeler Sampling Locations (1995)
N
SAMPLING LOCATIONS IN REACH 2
WELLS G & H.
WOBURN, MASSACHUSETTS
400
0
400
SCALE IN FEET
reachflood2


Davidson Park
SED-07-10
SED-07-05
SD-07-01
SED-07-02
Aberjona River
SED-06-03
SD-06-01
Judkins Pond
LEGEND
Well Location
Metcalf & Eddy Sampling Locations (1997)
Foster & Wheeler Sampling Locations (1995)
N
SAMPLING LOCATIONS IN REACHES 3 & 4
WELLS G & H.
WOBURN, MASSACHUSETTS
400
0
400
SCALE IN FEET
reachflood3


River
Aberjona
SED-05-03
SD-05-01
LEGEND
Well Location
Metcalf & Eddy Sampling Locations (1997)
Foster & Wheeler Sampling Locations (1995)
N
SAMPLING LOCATIONS IN REACH 5
WELLS G & H.
WOBURN, MASSACHUSETTS
200
0
200
SCALE IN FEET
reachflood5


Upper
Mystic
Lake
SD-04-01
SED-04-03
SED-04-02
SED-03-02
SD-03-01
SD-02-01
SED-02-01
SED-02-02
SD-01-01
SED-01-07
SED-01-06
LEGEND
Well Location
Metcalf & Eddy Sampling Locations (1997)
Foster & Wheeler Sampling Locations (1995)
N
SAMPLING LOCATIONS IN REACH 6
WELLS G & H.
WOBURN, MASSACHUSETTS
300
0
300
SCALE IN FEET
reachflood6

## TABLE 2-1. SAMPLING SITES AND LOCATIONS

| Sample Site | Sample Location | Geographic Location |
|---|---|---|
| 1 | #06, #07 | Upper Mystic Lake, Sandy Beach |
| 2 | #01, #02 | Upper Mystic Lake, Near Narrow Area |
| 3 | #02 | Upper Mystic Lake, Near Boat Launch |
| 4 | #02, #03 | Upper Mystic Lake, Aberjona River Inlet |
| 5 | #03 | Gauge Station Off Mystic Valley Parkway |
| 6 | #03 | Judkins Pond, near High School |
| 7 | #02, #05, #10 | Davidson Park |
| 10 | #01, #02 | Salem Street Bridge |
| 11 | #01 | Aberjona Wetlands, Well G River |
| 12 | #01, #03 | Aberjona Wetlands, Well H River |
| 13 | #01, #03 | Aberjona Wetlands, near railroad sidetrack |
| 15 | #01 | Aberjona Wetlands, west of Well G |
| 18 | #02, #03 | Aberjona Wetlands, near Rifle Range Road |
| 19 | #01 | Aberjona Wetlands, near Well G |
| 20 | #01 | Aberjona Wetlands, near dirt road |
| 21 | #01 | Aberjona Wetlands, floating bog near railroad |
| 22 | #02 | Aberjona Wetlands, west of Dewey Street |
| 24 | #03 | Maple Meadow Brook and Route 129 |
| 25 | #02 | North end of Horn Pond |

Total Number of sampling sites = 19

Total Number of sampling locations = 28

## TABLE 2-2. SAMPLE SITE/LOCATION DESCRIPTIONS

| SAMPLING SITE | SAMPLING LOCATION | DESCRIPTION |
|---|---|---|
| SED-01 | SED-01-06<br>Sampled: 11-12-97 | Upper Mystic Lake<br>• ~ 35' from shore<br>• water ~ 7' deep<br>• brown, gelatinous muck<br>• sample sieved<br>• amphipod observed in sample |
| | SED-01-07<br>Sampled: 11-12-97 | Upper Mystic Lake<br>• ~ 50' from shore<br>• water ~ 8' deep<br>• brown muck, "wetter" than SED-01-06, retains water<br>• sample sieved |
| SED-02 | SED-02-01<br>Sampled: 11-13-97 | Upper Mystic Lake<br>• ~ 15' from shore<br>• water ~ 5' deep<br>• black muck, roots in sample<br>• sample sieved |
| | SED-02-02<br>Sampled: 11-13-97 | Upper Mystic Lake<br>• ~ 20' from shore<br>• water ~ 7' deep<br>• black muck, roots and plants in sample<br>• sample sieved |
| SED-03 | SED-03-02<br>Sampled: 11-13-97 | Upper Mystic Lake<br>• ~ 15' from shore<br>• water ~ 1.5' deep<br>• mucky, organic odor<br>• large snail in sample<br>• sample dried on filter paper |

## TABLE 2-2. SAMPLE SITE/LOCATION DESCRIPTIONS

| SAMPLING SITE | SAMPLING LOCATION | DESCRIPTION |
|---|---|---|
| SED-04 | SED-04-02<br>Sampled: 11-14-97 | Upper Mystic Lake<br>• ~ 50' from shore<br>• water ~ 7' deep<br>• dark, leaves, aquatic plants, no sand in sample<br>• sample sieved |
| SED-04 | SED-04-03<br>Sampled: 11-14-97 | Upper Mystic Lake<br>• ~ 25' from shore<br>• water ~ 7' deep<br>• dark, leaves, aquatic plants, no sand in sample<br>• sample sieved |
| SED-05 | SED-05-03<br>Sampled: 11-13-97 | Aberjona River, Winchester<br>• middle of river bed<br>• water ~ 3' deep, moving<br>• hard muck, dense, difficult to sample<br>• petroleum odor & sheen<br>• no drying performed |
| SED-06 | SED-06-03<br>Sampled: 11-18-97 | Judkins Pond, Winchester<br>• ~ 10' from shore<br>• water ~ 4' deep<br>• dark, very fine particles in sediment, "pudding - like" consistency<br>• sheen appeared on water while sampling<br>• dried with filter paper |

## TABLE 2-2. SAMPLE SITE/LOCATION DESCRIPTIONS

| SAMPLING SITE | SAMPLING LOCATION | DESCRIPTION |
|---|---|---|
| SED-07 | SED-07-02<br>Sampled: 11-20-97 | Davidson Park, Winchester<br>• ~ 40' from shore<br>• water ~ 3.4' deep<br>• black, mucky, many worms in sample<br>• sheen appeared on water while sampling<br>• dried on filter paper |
| | SED-07-05<br>Sampled: 11-20-97 | Davidson Park, Winchester<br>• ~ 4' from shore<br>• water ~ 1.2' deep<br>• black, mucky, large number of worms in sample<br>• slight sheen appeared on water while sampling<br>• dried on filter paper |
| | SED-07-10<br>Sampled: 11-19-97 | Davidson Park, Winchester<br>• ~ 2' from shore<br>• water ~ 2' deep<br>• black, mucky, several worms in sample<br>• occasional sheen appeared on water while sampling<br>• dried on filter paper |
| SED-10 | SED-10-01<br>Sampled: 11-19-97 | Aberjona River at Salem St.<br>• ~ 30' from shore<br>• water ~ 2' deep<br>• very dark, roots, leaves in sample<br>• dried on filter paper |

## TABLE 2-2. SAMPLE SITE/LOCATION DESCRIPTIONS

| SAMPLING SITE | SAMPLING LOCATION | DESCRIPTION |
|---|---|---|
| SED-10 | SED-10-02<br>Sampled: 11-19-97 | Aberjona River at Salem St.<br>• ~ 25' from shore<br>• water ~ 2' deep<br>• very dark, peaty, roots, leaves in sample<br>• dried on filter paper |
| SED-11 | SED-11-01<br>Sampled: 11-14-97 | Aberjona River Wetlands<br>• sampled middle of main river channel<br>• water ~ 1' deep<br>• brown, peaty sediment<br>• sheen in sample<br>• dried on filter paper |
| SED-12 | SED-12-01<br>Sampled: 11-20-97 | Aberjona River Wetlands<br>• sampled in cattails immediately downgradient from upland area<br>• water ~ 1' deep<br>• dark, mucky sediment, high organic content with roots and decaying leaves<br>• dried on filter paper |
| | SED-12-03<br>Sampled: 11-20-97 | Aberjona River Wetlands<br>• sampled at bend in main river channel<br>• water ~ 5' deep<br>• dark, mucky sediment, peaty and thick texture<br>• dried on filter paper |

TABLE 2-2. SAMPLE SITE/LOCATION DESCRIPTIONS

| SAMPLING SITE | SAMPLING LOCATION | DESCRIPTION |
|---|---|---|
| SED-13 | SED-13-01<br>Sampled: 11-17-97 | Aberjona River Wetlands<br>• sampled in deep backwater of river channel<br>• water ~ 2' deep<br>• very black, organic sediment<br>• dried on filter paper |
| | SED-13-03<br>Sampled: 11-17-97 | Aberjona River Wetlands<br>• sampled in main river channel<br>• water ~ 2' deep<br>• sediment fibrous, mucky<br>• dried on filter paper |
| SED-15 | SED-15-01<br>Sampled: 11-17-97 | Aberjona River<br>• sampled in main river channel next to FW stake<br>• water ~ 2.5' deep<br>• sampled ~ 4' from shore<br>• brown, peaty sediment<br>• dried on filter paper |
| SED-18 | SED-18-02<br>Sampled: 11-18-97 | Aberjona River<br>• sampled in small inlet off of main river channel<br>• water ~ 6" deep<br>• dark brown, mucky, fibrous sediment<br>• dried on filter paper |

## TABLE 2-2. SAMPLE SITE/LOCATION DESCRIPTIONS

| SAMPLING SITE | SAMPLING LOCATION | DESCRIPTION |
|---|---|---|
| SED-18 | SED-18-03<br>Sampled: 11-18-97 | Aberjona River<br>• sampled in small stream off of main river channel<br>• water ~ 2-4" deep<br>• black, mucky, fibrous sediment<br>• dried on filter paper |
| SED-19 | SED-19-01<br>Sampled: 11-19-97 | Aberjona River Wetland<br>• sampled near Well G<br>• water ~ 2-3" deep<br>• peaty, black sediment, decaying vegetation<br>• orange sheen present<br>• dried on filter paper |
| SED-20 | SED-20-01<br>Sampled: 11-17-97 | Aberjona River<br>• sampled in small pond off of main river channel<br>• water ~ 2' deep, mat of floating aquatic vegetation<br>• brown, fibrous sediment<br>• dried on filter paper |
| SED-21 | SED-21-01<br>Sampled: 11-14-97 | Aberjona River Side Channel<br>• water ~ 1' deep<br>• brown, organic smell, coarse organic matter<br>• dried on filter paper |

**TABLE 2-2. SAMPLE SITE/LOCATION DESCRIPTIONS**

| SAMPLING SITE | SAMPLING LOCATION | DESCRIPTION |
|---|---|---|
| SED-22 | SED-22-02<br>Sampled: 11-12-97 | Dewey Street Swamp<br>• moist area with no standing water<br>• sampled with bulb planter to a depth of 6"<br>• brown, peaty soil, earthworms present<br>• sample not dried |
| SED-24 | SED-24-03<br>Sampled: 11-12-97 | Aberjona River, Wilmington<br>• sampled in center of stream channel<br>• water ~ 1' deep<br>• sediment soft, deep, dark brown, mucky, gelatinous<br>• dried on filter paper |
| SED-25 | SED-25-02<br>Sampled: 11-18-97 | Horn Pond, Woburn<br>• sampled ~ 25' from point<br>• bottom very rocky, sandy<br>• algae covering substrate<br>• fine sediments, "soupy"<br>• sample sieved |